Remarks

The applicant respectfully submits that proper status identifiers had been provided to indicate the current status of all claims in the Application. More specifically, the claims submitted previously as "amended" have been relabeled "currently amended."

With regards to the examiner's assertion that the specification does not include markings to indicate corrections to the original specification, the applicant respectfully submits that as previously stated above, the substitute specification both marked up and clean copies have been provided.

Rejections under 35 U.S.C. § 102

Claims 1-3, 5-10, 12-15, and 17-21 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Howell, et al. (U.S. Patent No. 6,639,623). The Examiner states:

> Howell (figure 3 and figure 17) discloses a ceiling mount (12) comprising a first and second conduits (22, 24, 46, 94) and a base (plate above 22), a support arm (48) with a first joint (122 and 54), mounting assembly (42), a second joint (near 68 or 72), cables (406 and 452, column 18, lines 46ff, column 10, lines 52ff, see figure 5, 6, 18, and 19), a rotators (see figure 3).

Applicant respectfully submits that Howell fails to teach the pendulum mount of independent Claims 1, 10 and 16. More specifically, the Applicant respectfully submits that the embodiments of the present invention as presented in amended Claims 1, 10 and 16 can be distinguished from Howell. The first joint the examiner cites as first joint 122 and 54 actually comprises two joints wherein the central hub, hub sections 22, 24, 46 and 94, are operable to rotate 360 degrees about the central axis 26 of the ceiling mount. Additionally, a second joint, 122 and 54 as shown in FIGs. 1 and 3, allows additional rotation at an angle of less than 360 degrees offset radially from the central axis of the ceiling mount.

Applicant respectfully submits that the first joint within independent Claims 1, 10 and 16 is operable to rotate about the central axis of the ceiling mount in a first (x, y) plane

perpendicular to the central axis. Additionally, this joint is able to reposition the support arm at an angle in the (y, z) plane to the first (x, y) plane. FIGs. 4 and 5 describe the rotation of the pendulum mount about the base or ceiling mount within the (x, y) plane of the ceiling mount while FIG. 5 depicts that the first joint allows support arm 34 to be repositioned at an angle to the (x, y) plane. This combined motion is not present in the teachings of Howell.

Applicant respectfully submits with respect to the second joint near 68 or 72, that the joints depicted near 68 or 72 are two additional joints which would be the third and fourth joint within support arm 48. Applicant further submits that support arm 48 involves a joint 46 at the central hub and involves the ability to rotate central hub 46 about axis 26 of the ceiling mount. Additional planetary rotation is evidenced by joints 54 and 122. There is further rotation associated with another joint as described by motion 124 between vertical supports 52 and 62 of support arm 48. Additionally, there are joints located about 68, 72, 74 and 80. For a total of at least 7 seven joints associated with the support arm 48.

Applicant respectfully submits that the support arm of the present invention provides a much simpler configuration, able to swing free of the work theater as evidenced by the stowed positions of support arm 34 parallel to the (x, y) plane of drop ceiling 26 depicted in FIG. 5. The second joint 40 between support arm 34 and rotator coupling display 38 to hinge 40 allows display screen 38 to be rotated at an angle in a second (x, y) plane about the mounting assembly and also allows the display screen to be positioned at any angle in a (y, z) plane relative to support arm 34. Applicant respectfully submits that the second joint 72 of Howell is unable to be positioned independent of the joint 68. Therefore, the shaft 130 of the monitor display is unable to be positioned in any other position other than the horizontal. This is due to the fact that joint 68 and 72 are mechanically coupled in such a manner as to prevent shaft 130 from being positioned at a nonparallel angle to that of the vertical axis 64 of the vertical section of support arm 48.

As such, Applicant respectfully requests the Examiner withdraw the rejections and allow Claims 1-3, 5-10, 12-15, and 17-21.

Rejections under 35 U.S.C. § 103

Claims 4, 11, and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Howell (U.S. Patent No. 6,639,623) in view of Sweere, et al. (U.S. Patent No. 5,924,665). The Examiner states:

> Howell discloses all of the limitations of the claimed invention except for the gas tension spring. Sweere teaches that it is known to have an arm having a tension between the support arm and the mount (figure 1) being a gas tension spring (25). It would have been obvious to one having ordinary skill in the art to have modified Howell to have include the gas tension spring for the purpose of providing a better means of positioning the support arm when the user moves the arm to a desired position,

Applicant respectfully points out that in order to combine references for an obviousness rejection, there must be some teaching, suggestion or incentives supporting the combination. *In re Laskowski*, 871 F.2d 115, 117, 10 U.S.P.Q. 2d 1397, 1399 (Fed. Cir. 1989). The mere fact that the prior art could be modified does not make that modification obvious unless the prior art suggests the desirability of the modification. *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). In addition, it is well established that Applicant's disclosure cannot be used to reconstruct Applicant's invention from individual pieces found in separate, isolated references. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988).

Applicant respectfully submits that there is no motivation, teaching or suggestion to combine Howell with Sweere. Therefore, the rejection on a combination of these references is inappropriate. Withdrawal of the rejection allowance of Claims 4, 11, and 16 respectfully requested. With respect to Sweere, the applicant submits that there are no teachings to combine Howell and Sweere because Howell lacks the need of a gas tension or other type tension spring. Support arm 48, illustrated in the figures of Howell, contains a horizontal element 50 and a rigidly coupled vertical element 52. The lower vertical section 62 coupled to vertical section 52 allows rotation about the vertical axis of the vertical element. The internal configurations of joint 68 and 72 prevent independent motion of the joint and ensure that horizontal shaft 130 to which the display mounting system couples to support arm 48 remains vertical and parallel to the vertical axis of vertical segments 52 and 62 of support arm 48. Because these sections are rigidly defined, and the joints 68 and 72 failed to move independently, one would not think to combine

the teachings of Howell with Sweere which uses a gas tension spring in order to provide a better means of positioning the support arm. The support arm in Howell is rigid, the segment of the support arm of Howell are fixed within a vertical or horizontal plane, as evidenced by horizontal segment 50 and vertical segments 52 and 62. Therefore, one would not combine the teachings of Howell with that of Sweere because Howell teaches a way from the need to position the support arm at an angle segments of the support arm at an angle other than normal to the (x, y) plane of the ceiling mount.

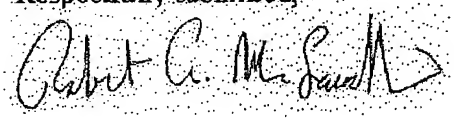
The applicant further submits that Sweere may also be distinguished from the present invention in that Sweere fails to teach that the support arm may rotate about an axis normal to the plane of the mount. The mount of Sweere may rotate as evidenced by may rotate at an angle to the X and Y axis of the mount. But not along the axis normal to the mount. This is shown in Figure 1 where the display arm may pivot about axis 28 and 26.As such, Applicant respectfully requests the Examiner withdraw the rejections and allow Claims 4, 11, and 16.

Conclusion

Applicants have now made an earnest attempt to place this case in condition for allowance. For the foregoing reasons and for other reasons clearly apparent, Applicants respectfully request full allowance of Claims 1-21.

It is believed no fee is due with this transmission, however, should a fee be determined due with this transmission, the Commissioner is authorized to debit Deposit Account No. 50-2240 of Koestner Bertani, LLP.

Respectfully submitted,



Robert A. McLauchlan
Reg. No. 44,924
ATTORNEY FOR APPLICANTS

Dated: August 13, 2006

Koestner Bertani, LLP
4201 W. Parmer Lane
Suite A-100
Austin, Texas 78727
(512) 399-4100
(512) 692-2529 (Fax)

ATTORNEY DOCKET NO.: 1046.P001USC1 PATENT APPLICATION

SUBSTITUTE SPECIFICATION SHOWING CHANGES

SYSTEM AND METHOD OF MOUNTING A DISPLAY SCREEN VIA A PENDULUM TYPE MOUNT

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates generally to systems and methods of mounting a display screen, and more particularly, a system and method that utilizes a pendulum mount to hold a display screen in a variety of positions for a reclined or un-reclined viewer.

ATTORNEY DOCKET NO.: 1046_-P001USC1 PATENT APPLICATION

SUBSTITUTE SPECIFICATION SHOWING CHANGES

BACKGROUND OF THE INVENTION

[0002] Before and during a dental procedure, dentists or their assistants typically discuss the procedure with the patient. To facilitate this discussion, a view screen or other visual aid that can be easily positioned and then removed from the immediate field of view is desirable. This screen assists the dentist in describing the procedure to patients and allows the results of photos, X-rays or other tests performed to be shown to the patient. Existing systems do not provide a visual aid than can be easily positioned near and then removed from the patient's field of view. Additionally, existing display screens cannot be positioned to allow a patient to view the display screen in an upright position before the dental procedure begins, and in a reclined position that allows the patient to be entertained during the actual dental procedure.

[0003] During dental procedures, the patients lay in a horizontal rather than vertical position. Thus, a display screen capable of being easily viewed in both a horizontal and a vertical position would satisfy this need. In addition to showing patients information regarding their procedure, patients may view DVD, television or other form of entertainment during the procedure. This entertainment would significantly improve their experience at the dentist.

[0004] No fixed point exists where a monitor or other visual aid can be mounted that addresses these needs. One solution involves mounting an actual television in the ceiling of a dental office. However, problems associated with this solution include the risk of heavy equipment falling onto the patient. Additionally, the mechanical supports for such systems are typically bulky and cumbersome. Another solution places a television set on a fixed brace at a 45-degree angle. While this

SUBSTITUTE SPECIFICATION SHOWING CHANGES

provides a better solution, the solution creates problems in viewing the display screen in both the vertical or the horizontal position as the patient is always at a 45-degree angle to the display screen. Additionally, patients often recline in a past horizontal position decreasing the usefulness of this solution. This position arises from many dental procedures, which often require the patient's head to be inclined further for access. Furthermore, the television mounts to a fixed location and cannot be repositioned for individual patients.

[0005] Mounting a display screen at a 45-degree angle does not provide a solution for most cases. Flat panels displays may not be clearly viewed as the viewers angle deviates from normal. Furthermore, mounting a television in the ceiling creates a hazard if the television were to fall, and operational problems for televisions, which were not designed to operate in a horizontal position. Additionally, instances exist when the dentist would prefer to show the patient an intra-oral picture taken during the procedure to facilitate authorizing changes to the scope of the dental procedure. Previously, the patient would sit up for this discussion, while the procedure was temporarily stopped.

[0006] Another problem associated with existing solutions are bulky cables, which distract the patients' view. In the prior art solution shown in FIGURE 1, a monitor 10 mounts to ceiling 12 via bracket 14, wherein cables 16 run along the exterior of the bracket and ceiling. Visible cables 16 quite often are unsightly. Additionally, support arm 18 is relatively short and does not bring the view screen near the patient. Thus a need exists for a mount with multiple degrees of freedom that allows a display to be positioned so that a dental patient may view the display during all phases of dental procedures or be easily removed and not interfere with the dental procedure.

SUBSTITUTE SPECIFICATION SHOWING CHANGES

SUMMARY OF THE INVENTION

[0007] The present invention provides a pendulum mount to support a display screen that substantially eliminates or reduces disadvantages and problems associated with previously developed systems and methods used to mount a display screen. The pendulum mount includes a ceiling mount attached to the ceiling or other support with cables that run within the ceiling mount to a support arm mechanically coupled to the ceiling mount. A first joint mechanically couples the ceiling mount to the support arm and the cables exit the ceiling mount and enter the support arm at the first joint. Then, the cables run within the support arm to a second joint. A mounting assembly that supports the display screen is mechanically coupled to the support arm at the second joint. As with the first joint, the cables exit the support arm and may either enter the mounting assembly at the second joint or directly couple to the display screen. These cables provide video feeds, audio feeds, or power supplies to the display screen.

[0008] In one embodiment, the ceiling mount is composed of a conduit and a base wherein the base is mechanically coupled to the ceiling and the conduit. A first degree of freedom exists in that the conduit may rotate +/- 360° relative to the base. Tension between the support arm and the ceiling mount prevents the support arm from resting in a neutral position. This is because the tension between the support arm and the ceiling mount, which may be exerted by a gas tension spring, or other like device known to those skilled in the art, counterbalances the display screen mounted operably coupled to the support arm at the second joint.

[0009] In another embodiment, the tension between the support arm and the ceiling mount is provided by a friction hinge. The mounting assembly may be made to comprise a second conduit and a

SUBSTITUTE SPECIFICATION SHOWING CHANGES

rotator mechanically coupled to the second conduit. The rotator allows the display screen to be rotated +/- 360° relative to the rotator while the second joint provides an additional degree of freedom by adjusting the angle in the Z-axis relative to the display screen. Additionally, tension between the support arm and the mounting assembly prevent the display screen from merely resting in a neutral position. Cables may travel along a channel within the first joint and the second joint in order to hide the cables from view.

[0010] Yet another embodiment of the present invention provides a pendulum mount to support a display screen for a dental patient. This pendulum mount includes a ceiling mount having a conduit and a base that mechanically couples to the ceiling as well as the conduit. The conduit is operable to rotate +/- 360° relative to the base and cables for power, video, audio or other feeds to the display screen run within the conduit. A support arm mechanically couples to the ceiling mounts with a first joint. The cables exit the conduit at the first joint and enter the support arm. Then the cables run within the support arm to a second joint. Tension between the support arm and the ceiling mount prevents the support arm from resting in a neutral position. This is achieved by choosing tension springs, mechanical springs, gas pistons, or other systems known to those skilled in the art, to counterbalance the moment of the display screen at the far end of the support arm. A mounting assembly at the far end of the support arm supports the display screen for the dental patient. Additionally, the mounting assembly mechanically couples to the support arm via the second joint. As with the first joint, cables exit the support arm and enter the second joint and then run within the mounting assembly and are operably coupled to the display screen. Alternatively the cables exit the support arm and directly couple to the display screen.

SUBSTITUTE SPECIFICATION SHOWING CHANGES

This allows the display screen to be positioned such that the line of sight of the patient is normal to the XY plane of the display screen no matter the position or inclination of the patient. For example, the patient may be in a reclined position, reclined past horizontal or upright position while the present invention allows the patient's line of sight to be normal to the XY plane of the display screen.

SUBSTITUTE SPECIFICATION SHOWING CHANGES

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following description taken in conjunction with the accompanying drawings in which like reference numerals indicate like features and wherein:

[0012] FIGURE 1 illustrates one prior art solution;

[0013] FIGURE~~FIGURES~~ 2A illustrates~~and 2B illustrate~~ a pendulum mount in a stowed or supine position in accordance with an embodiment of the present invention~~various positions~~;

[0014] FIGURE 2B illustrates a pendulum mount in a consultation position in accordance with an embodiment of the present invention;

[0015] FIGURE ~~FIGURES~~ 3A depicts~~and 3B depict~~ the freedom of motion to rotate within an (x; y) associated with the display screen in accordance with an embodiment of the present invention;

[0016] FIGURE 3B depicts the freedom of motion provided by a hinged joint in accordance with an embodiment of the present invention;

[0017] FIGURE 4 illustrates how the support arm can rotate about the pendulum mount in accordance with an embodiment of the present invention;

[0018] FIGURE 5 depicts how the support arm can swing relative to the pendulum mount in accordance with an embodiment of the present invention;

[0019] FIGURE 6 further illustrates one component of the pendulum mount in accordance with an embodiment of the present invention;

[0020] FIGURE 7 further illustrates the top hinge tube of the pendulum mount that couples to the component of FIGURE 6 in accordance with an embodiment of the present invention;

SUBSTITUTE SPECIFICATION SHOWING CHANGES

[0021] FIGURE 8A depicts a first cross section view~~three views~~ of one embodiment of one half of the hinge in accordance with an embodiment of the present invention;

[0022] FIGURE 8B depicts a top down view of one embodiment of one half of the hinge in accordance with an embodiment of the present invention;

[0023] FIGURE 8C depicts a second cross section view of one embodiment of one half of the hinge in accordance with an embodiment of the present invention;

[0024] FIGUREs 9A and 9B illustrate the friction wheel which resides within the hinge components in accordance with an embodiment of the present invention;

[0025] FIGURE 10 illustrates a fully extended hinge with cables running within the hinge in accordance with an embodiment of the present invention;

[0026] FIGURE 11 illustrates a full hinge bent at 90° with cables running within the hinge in accordance with an embodiment of the present invention;

[0027] FIGURE 12 provides an example of how the support arm is balanced by tension springs in accordance with an embodiment of the present invention;

[0028] FIGURE 13A provides a cross section~~two~~ view of an assembled mounting assembly in accordance with an embodiment of the present invention;

~~**[0025]** FIGURE 13B14 depicts the rotator of the mounting assembly;~~

[0029] ~~FIGURE 15~~ provides a top down view of an assembled mounting assembly in accordance with an embodiment of the present invention;

[0030] FIGURE 14A provides a cross sectional view of the rotator of the mounting assembly in accordance with an embodiment of the present invention;

SUBSTITUTE SPECIFICATION SHOWING CHANGES

[0031] FIGURE 14B provides a top down view of the rotator of the mounting assembly in accordance with an embodiment of the present invention;

[0032] FIGURE 14C provides a side view of the rotator of the mounting assembly in accordance with an embodiment of the present invention;

[0033] FIGURE 15A provides a cross sectional view~~drawing~~ of the rotator cap used to affix the rotator to the support plate in accordance with an embodiment of the present invention~~;~~ ~~and~~

[0034] FIGURE 15B provides a top down view of the rotator cap used to affix the rotator to the support plate in accordance with an embodiment of the present invention; and

[0035] FIGURE 16A provides a cross sectional view of support plate affixed to the display screen in accordance with an embodiment of the present invention;

[0036] FIGURE 16B provides a top down view of support plate affixed to the display screen in accordance with an embodiment of the present invention.

~~FIGURE 16 illustrates the support plate on which a view screen is mounted.~~

SUBSTITUTE SPECIFICATION SHOWING CHANGES

DETAILED DESCRIPTION OF THE INVENTION

[0037] Preferred embodiments of the present invention are illustrated in the FIGJREs, like numerals being used to refer to like and corresponding parts of the various drawings.

[0038] The present invention provides a pendulum mount for a monitor, visual display or other vertical work surface. A ceiling mount hingedly attaches to a support arm at a first joint. On the opposite end of the support arm a second joint allows a flat panel display or monitor to be attached. Optical, electrical, or other like cables for the display screen or monitor run internally within the support arm, and ceiling mount in order to remove unsightly cables from view. Joints comprise a friction joint or other like joint as known to those skilled in the art. These joints provide tension that allow the support arm to be positioned anywhere within its range of motion without returning to a neutral position.

[0039] FIGURES 2A, 2B and 2C illustrate one embodiment of the present invention. Here, pendulum mount 20 mounts to ceiling joist 22 via base 24. Drop ceiling 26 is illustrated as a cutout wherein flange 28 covers the interface with the ceiling. Top hinge tube 30 attaches to base 24 via a series of threads or other like means. Top hinge tube 30 may rotate up to 360 degrees in either direction within base 24. This rotation provides one degree of freedom. This rotatich helps to allow support arm 34 to be positioned into any crientation. Hinge 32 couples top hinge tube 30 to support arm 34 and provides a second degree of freedom. To prevent support arm 34 from resting in a vertical or neutral position, gas tension springs 36 or other like devices as known to those skilled in the art, place sufficient tension on support arm 34 to counterbalance the moment of display 38. This counterbalance prevents support arm 34 from swinging free to a vertical or neutral position.

SUBSTITUTE SPECIFICATION SHOWING CHANGES

[0040] FIGURE 2B depicts pendulum mount 20 in a neutral position with support arm 34 in a vertical position. In this position gas tension springs 36 are fully extended. Support arm 34 couples to a display screen 38 via lower hinge 40.

[0041] FIGURES 2A and 2B depicts hinge 40 as a friction hinge. The mounting~~Mounting~~ assembly ~~42~~ mechanically couples to display 38 and support arm 34 at hinge 40. The mounting assembling may have a conduit within which cables ~~42~~ run, or alternatively, these cables may exit support arm 34 and directly couple to display 38. A rotator allows display 38 to rotate +/- 360° within its XY plane relative to the mounting assembly. Hinge 40 allows display 38 to be repositioned at an angle to the longitudinal axis of support arm 34. Additionally, when support arm 34 is in a horizontal position the gas springs 36 retract to support or counterbalance the moment caused on support arm 34 by display 38. Although gas tension springs are illustrated as one means to counterbalance the moment caused by display 38, other mechanisms known to those skilled in the art may be used to counterbalance the moment. One example includes a ratcheting mechanism that locks support arm 34 at various pre-determined angles.

[0042] Rotator 92~~42~~ couples hinge 40 to display screen 38 allowing display 38 to freely rotate in the XY-plane. This allows a dentist, patient, or other user to view the display screen in either a landscape or portrait mode. Display screen 38 can also be positioned in any intermediate orientation between portrait and landscape as shown in FIGURE 3A.

[0043] FIGURE 3A provides a front view of display screen 38 rotating a full 360 degrees while FIGURE 3B illustrates that display screen 38 can be rotated from top to bottom in tilt as provided by lower hinge 40. While cables are not shown in

SUBSTITUTE SPECIFICATION SHOWING CHANGES

FIGURES 2A through 2C, cables exit top hinge tube 30 at hinge 32 and then enter arm 34 at its hinged connection to tube 30.

[0044] The ratcheting concept may also be used at hinge 40 to position display screen 38 at various predetermined angles. A disadvantage associated with the ratcheting concept occurs if a failure of the ratcheting mechanism takes place or the inability of a user to reach high enough to disengage the ratcheting mechanism of arm 34 in a position parallel to the ceiling. Counterbalance provided by the gas tension springs 35 allow users to position display screen 38 throughout the entire range of motion with minimal force.

[0045] FIGURE 4 illustrates the range of motion available at the base and at the viewing screen. As shown here, support arm 34 freely rotates 360 degrees around base 24 in either direction. Similarly, display screen 38 rotates between portrait and landscape no matter the orientation of the viewer. FIGURE 4 failed to show the range of motion associated with hinge 32 and hinge 40 which allow support arm 32 to be repositioned and angled to the plane of the ceiling and the XY plane of the displaced grain 38. These angles are better illustrated in FIGURE 5.

~~[0036]~~[0046] FIGURE 5 provides a cross-section of the present invention. Here, all cables enter through a plenum inside the pendulum mount tube or base 24. Thus, the visual exposure of the cables is minimized. Flange 28 serves to interface between the pendulum mount tube 62 ~~24~~ and the drop ceiling 26. As shown, support arm 34 freely moves to all positions within a 180-degree arc from a non-use storage position 50 through an upright consultation viewing position 52, and supine viewing position 54. Two finely threaded tubes may facilitate the rotation of arm 34 about the pendulum mount tube 62.~~24.~~ One may notice that as the support arm 34 transitions from storage position 50 upright, consultation position 52, and a

SUBSTITUTE SPECIFICATION SHOWING CHANGES

reclined viewing position 54, that the counterbalance springs are fully extended in the upright or consultation position 52 while fully retracted in the storage position 50 for reclined viewing position 54. In the non-extended positions, the gas tension springs 36 counterbalance the moment on support arm 34 caused by display 38. Additionally, this counterbalance allows display 38 to be movable to all positions within a 180-degree arc. This is in contrast to a system employing a ratcheting system where the support arm 34 can only be positioned at discrete angles relative to the viewer.

~~[0037]~~[0047] FIGURE 6 depicts pendulum tube mount 24 in further detail. In FIGURE 6, base 60 attaches to pendulum mount tube 62 via a weld or other fastening means as known to those skilled in the art. The interior surface of pendulum mount tube 62 is threaded to receive the top hinge tube 30~~, 64~~. This threading allows pendulum mount tube 62 to freely rotate +/- 360° degrees relative to base 60, which is coupled to the ceiling.

~~[0038]~~[0048] FIGURE 7 further illustrates top hinge tube 30 wherein threads 64 along the upper half of top hinge tube 30 match threads on the inner surface of pendulum mount tube 62. The lower portion of top hinge tube 64 need not be threaded. Mounting holes 68 receive the upper arm of a gas tension spring 36 as previously discussed in FIGURES 2A, 2B and 2C. The two-piece assembly of the top base of the pendulum mount is hollow to facilitate the internal passage of cables. Furthermore, the two-piece threaded assembly allows top hinge tube 64 to rotate freely in either direction with respect to the pendulum mount tube 62. A stop screw or other like device may be installed to limit the motion of top hinge tube 64 with respect to pendulum mount tube 62. This stop prevents the top hinge tube 64 from detaching from pendulum mount tube ~~62~~.

SUBSTITUTE SPECIFICATION SHOWING CHANGES

[0046] ~~—~~ FIGURE 8 illustrates ~~one-half~~ of a hinge assembly. Both halves of both hinges are similar. Here, hinge assembly 66 couples to the top hinge tube 64 and is firmly attached by being pressed into, screw threads or other mechanical fastener. Within the hinge assembly 66, thrust bearing or friction wheel 70, which is further illustrated in FIGURE 9 is placed at the junction of the two hinge assembly pieces within pocket 72. Friction wheel assembly may be constructed of nylon to prevent metal-to-metal contact when hinge assembly 66 is constructed from metal. A bolt that passes through channel 76 firmly holds two hinge assemblies 66 together to form the hinges. A cavity or passage ~~74~~78 allows cables to run within hinge assembly 66 and any connected components of the pendulum mount. On the opposite end of support arm 34, rotator 92~~hinge 42~~ couples to display screen 38.

[0047] Figure 10 depicts two hinge assemblies 66 coupled together to form an integrated hinge 80. Here cables 16 run through cavity 74A, exit hinge assembly 66A, enter hinge assembly 66B and any coupled components via cavity 74B. Friction wheel 70 is located within pockets 72A and 72B. A bolt or other mechanical fastener, which passes through channel 76A and 76B, holds the two hinge assemblies together.

[0048] Figure 11 provides an additional view of hinge assembly 66A and 66B mechanically coupled together wherein cables 16 pass through interior cavity 74A and exit hinge assembly 66A, and then enter cavity 74B of hinge assembly 66B. In this depiction, hinge 80 is bent at a 90-degree angle.

[0049] FIGURE 12 depicts support arm 34 and the counterbalance problem that the present invention addresses. Gas tension spring 36 exert tension on support arm 34 in such a way as to balance the moment of the arm. Springs or other like devices and the length of section B of support arm 34 counterbalances the moment of support arm 34, having length D, and display 38 when attached.

SUBSTITUTE SPECIFICATION SHOWING CHANGES

When the pendulum mount is balanced, the product of A and B equal the product of C and D.

[0050] Figure 13 depicts the integrated components that couple hinge 40 to display 38. Here rotator 92 is seen within mounting assembly 90. Mounting assembly 90 utilizes a hinge assembly 66 into which rotator 92 is placed within cavity 74. In some embodiments a channel may be drilled through rotator 92 in order to allow cables to pass within rotator 92 held within cavity 74. A rotator cap 94 secures rotator 92 to base plate 96. Base plate 96 mechanically couples to display 38 by four mechanical fasteners threaded through channels 98. Rotator cap is secured to base plate 96 by similar mechanical fasteners that pass through channels 100.

[0051] Figure 14 shows rotator 92 removed from mounting assembly 90. Base 102 of the rotator has channels 104 which are used to secure rotator 92 with a mechanical fastener to hinge assembly 66. Figure 15 provides two views of rotator cap 94 wherein pocket 106 of the rotator cap secures base 102 of rotator 92. Channels 100 receive mechanical fasteners that allow the rotator cap 94 to be securely fastened to base plate 96. Figure 16 depicts base plate 96 having channels 98 which allow mechanical fasteners to secure the base plate and mounting assembly 90 to display 38 as well as channels 103 which receive the mechanical fasteners passing through channels 100 of the rotator cap to secure a rotator cap to the base plate 96.

[0052] In summary, the present invention provides a pendulum mount to support a display screen for a dental patient. This pendulum mount includes a ceiling mount having a conduit and a base that mechanically couples to the ceiling as well as the conduit. The conduit rotates relative to the base while cables for power, video, audio or other feeds to the display screen run within the conduit. A support arm mechanically couples to the

ceiling mounts with a first joint. The cables exit the conduit at the first joint and enter the support arm. Then the cables run within the support arm to a second joint. Tension between the support arm and the ceiling mount counterbalances the moment of the display screen. A mounting assembly at the far end of the support arm supports the display screen for the dental patient. Additionally, the mounting assembly mechanically couples to the support arm via the second joint. As with the first joint, cables exit the support arm and may directly couple to the display screen.

[0053] The present invention addresses the need for a mount with multiple degrees of freedom that allows a display to be positioned so that a dental patient may view the display during all phases of dental procedures or be easily removed and not interfere with the dental procedure. Additionally, the present invention may be used in other non-dental applications where a viewer may need to reposition a display screen for viewing or storage when not in use.

[0054] Although the present invention is described in detail, it should be understood that various changes, substitutions and alterations could be made hereto without departing from the spirit and scope of the invention.